

Ontario. Cottage Pollution
Control Program.

1970 Cottage Pollution Control
Program : Riley Lake.

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ONTARIO DEPARTMENT OF HEALTH
ONTARIO WATER RESOURCES COMMISSION
1970 COTTAGE POLLUTION CONTROL PROGRAM

RILEY LAKE

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As a result of recommendations contained in the March, 1970 report, on Environmental Management of Recreational Waters in Cottage Areas in Ontario, water quality surveys of Riley Lake located in the District Municipality of Muskoka were conducted by staff of the Ontario Water Resources Commission's District Engineers Branch during the periods of July 5 to 9 and September 24 to 27, 1970.

Staff of the Ontario Department of Health's Public Health Engineering Service had performed investigations of the on-shore private sewage disposal systems prior to 1970. Corrections to the faulty systems are now being carried out.

The bacteriological results, which were evaluated statistically by the OWRC's Bacteriological Branch, indicate that the bacterial levels met the OWRC bacteriological criteria for total body contact recreational use. The bacterial counts at each station were not significantly different from each other, and hence all stations are represented by a single bacterial count. During the summer survey, the geometric mean densities per 100 ml for the whole lake were 263.5 total coliform organisms, 8.9 fecal coliform organisms and 2.5 fecal streptococcus organisms. In the fall survey, the bacterial levels were 165.4 total coliform organisms, 3.7 fecal coliform organisms, and 3.4 fecal streptococcus organisms.

An increase in fecal coliforms at eleven locations on July 6 and at one location on July 7 suggests that fecal contaminants from Riley Creek and the lake environs entered the lake at that time.

Thermal stratification, a natural occurrence in many lakes, was observed during the summer survey in most of the lake except the southern arm (see appended map). During the fall survey, thermal stratification existed in the middle and east arm of the lake, its disappearance in the west arm having been caused naturally. Below the zone of rapid temperature change (thermocline), the dissolved oxygen content during each survey was below the minimum level designated for the preservation of biological organisms. The oxygen depletion in the bottom waters is attributed to decomposing settled organic matter on the lake bottom.

The chemical quality of the lake waters was found to be generally satisfactory. The mineral content was quite low, with the hardness varying from 12 to 18 ppm during the fall survey.

BACTERIOLOGICAL INDICATOR ORGANISMS

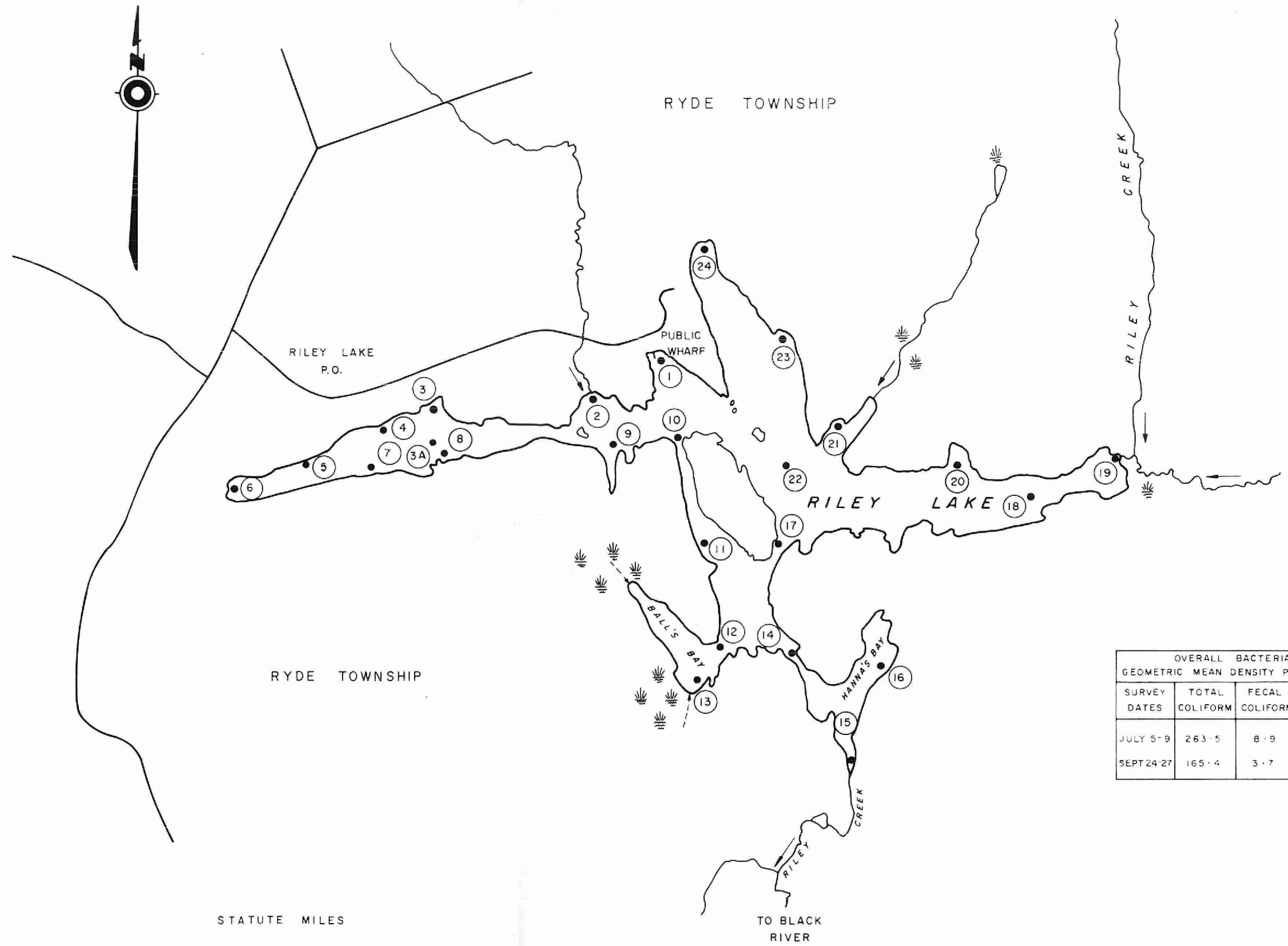
TOTAL COLIFORM organisms include a wide variety of bacteria ranging from the genus (group) Escherischia Coli (E. coli), which originate mainly in the intestines of man and other warm blooded animals, to the genera Citrobacter and Enterobacter aerogenes. The latter genera are basically found in soil but are also present in feces in small numbers. The presence of total coliforms in water may indicate soil run-off or, more important, less recent fecal pollution since organisms of the Enterobacter - Citrobacter groups tend to survive longer in water than do members of the Escherischia Coli group, and even to multiply when suitable environmental conditions exist.

The FECAL COLIFORM organisms are those coliform bacteria which are of intestinal origin and, therefore, are an indicator of recent fecal pollution. Most of the coliform bacteria found by the fecal coliform test are of the genus Escherichia Coli.

FECAL STREPTOCOCCI organisms are normal inhabitants of the large intestine of man and animals and generally do not multiply outside the human body. In waters polluted with fecal material, fecal streptococci are usually found along with fecal coliform bacteria but in smaller numbers. When the number of fecal streptococci bacteria approximates or is greater than the number of fecal coliform organisms, animals are the probable source.

The OWRC Guidelines and Criteria for Water Quality Management in Ontario (1970) indicate that water used for total body contact recreation can be considered impaired when the total coliform, fecal coliform, and/or fecal streptococcus geometric mean density exceeds 1000,100, and/or 20 per 100 ml, respectively.

NOTE: The term "geometric mean" refers to a type of average. Mathematically speaking, the geometric mean of a set of N numbers is the Nth root of the product of the numbers; in practice, it is computed by the use of logarithms.



OVERALL BACTERIAL GEOMETRIC MEAN DENSITY PER 100ML.			
SURVEY DATES	TOTAL COLIFORM	FECAL COLIFORM	FECAL STREP
JULY 5-9	263.5	8.9	2.5
SEPT 24-27	165.4	3.7	3.4

LEGEND (10) ● SAMPLING POINT → FLOW DIRECTION

ONTARIO WATER RESOURCES COMMISSION	
1970 RECREATIONAL LAKES PROGRAM	
RILEY LAKE	
SCALE: AS SHOWN	
DRAWN BY: A.J.H.	DATE: JULY 1971
CHECKED BY: R.C.M.	DRAWING NO: 71-63-DE



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